

(No Model.)

2 Sheets—Sheet 1.

W. C. MACKINNEY.
TEXTILE STRETCHING DEVICE.

No. 573,095.

Patented Dec. 15, 1896.

FIG. 1.

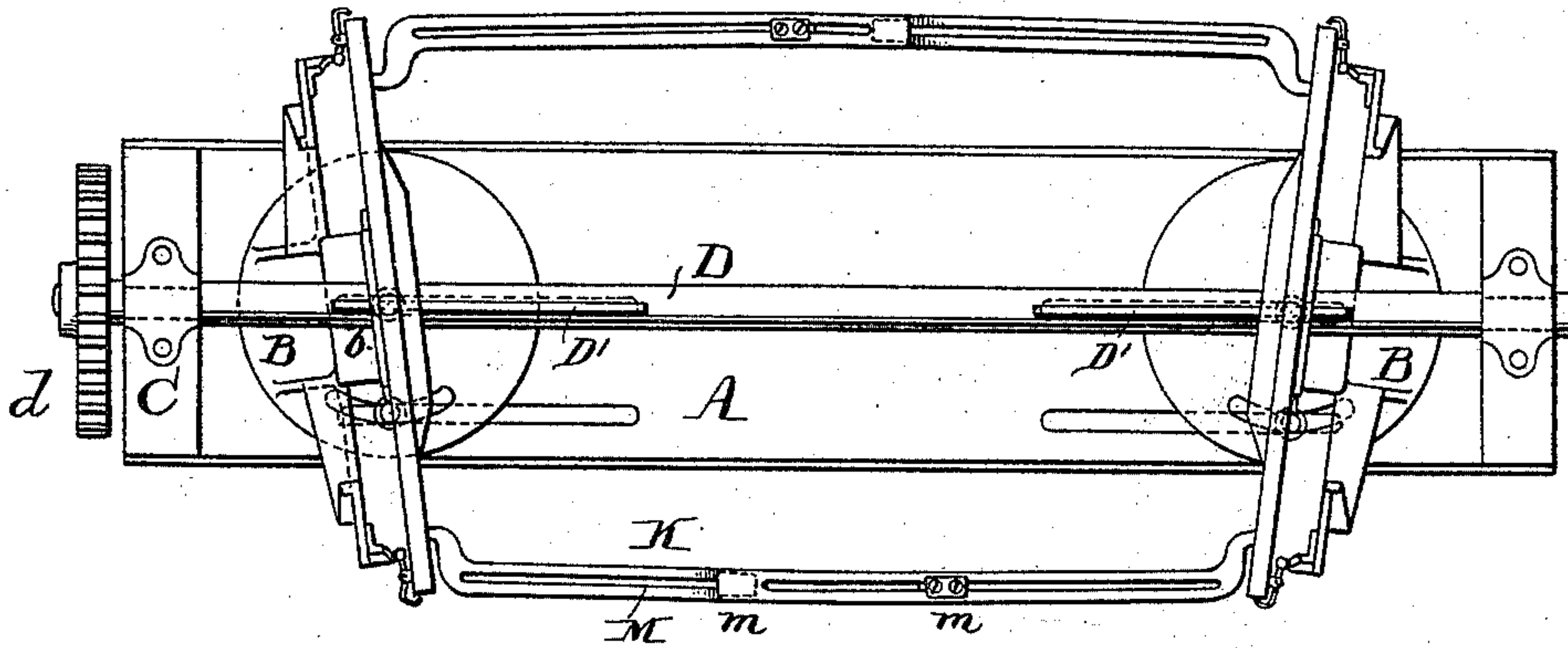


FIG. 2.

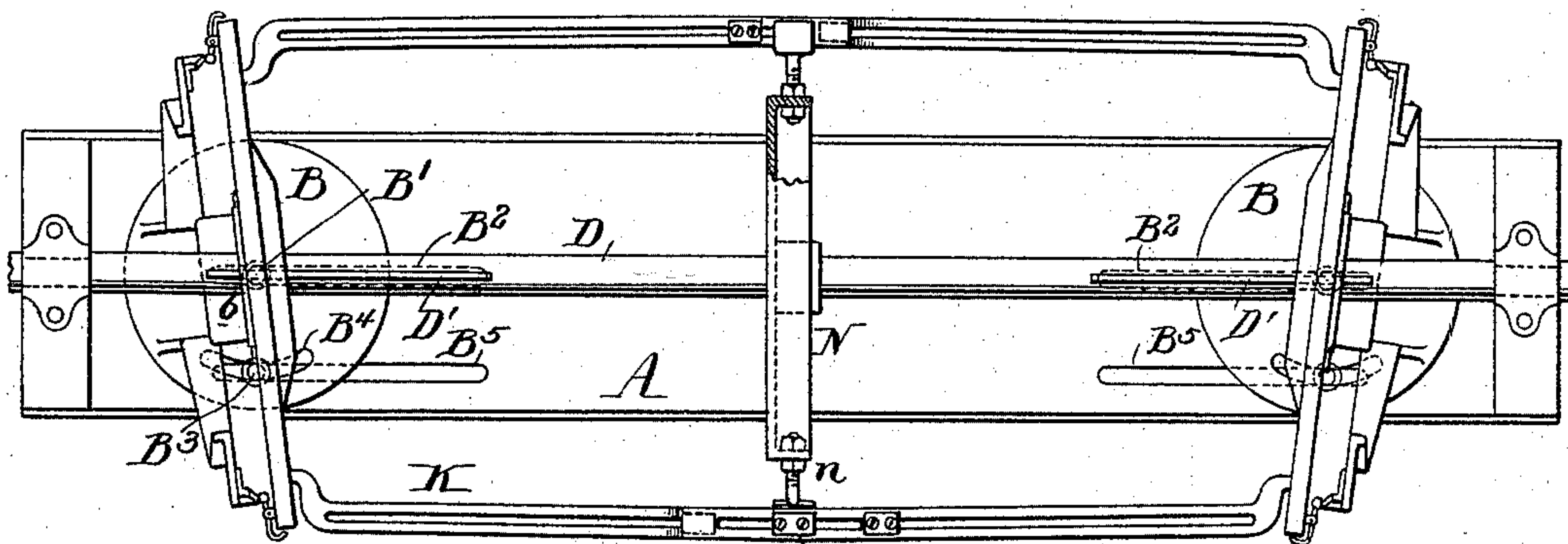


FIG. 5.

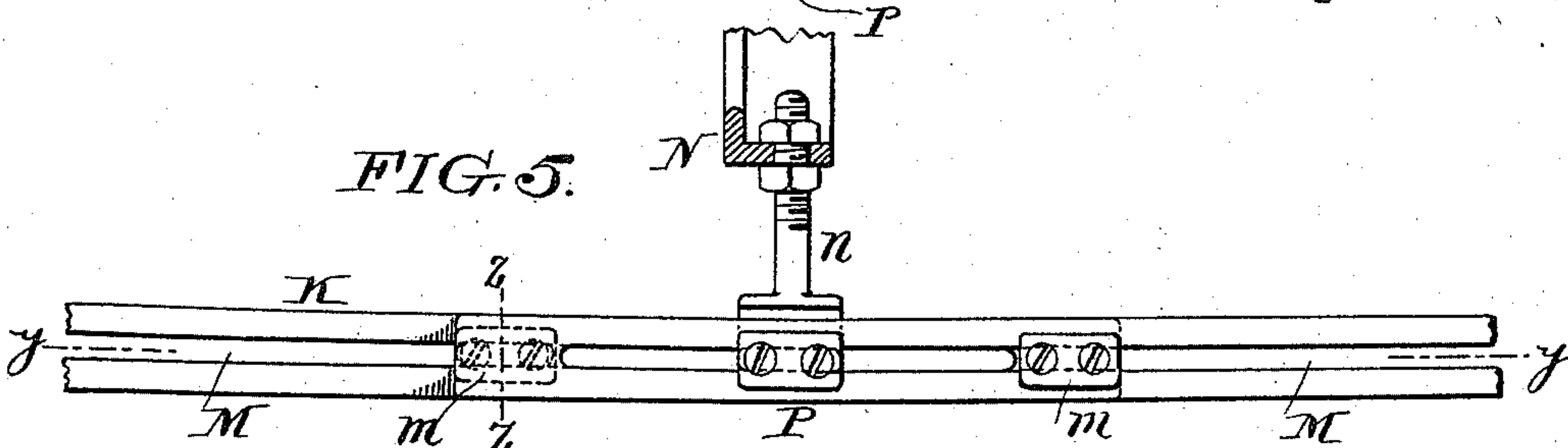
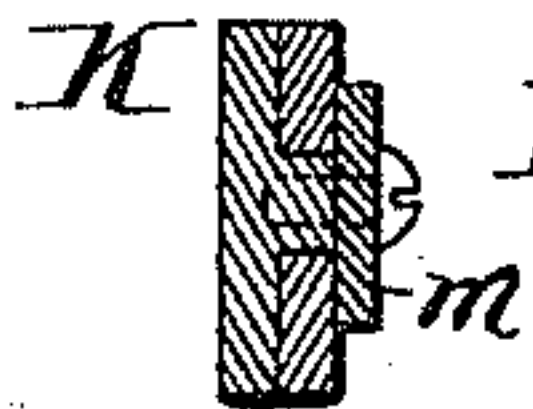


FIG. 6.



FIG. 7.



WITNESSES:

Henry D. ...
Am. L. Evans

INVENTOR:

William C. Mackinney

By his atty
J. M. ...

(No Model.)

2 Sheets—Sheet 2.

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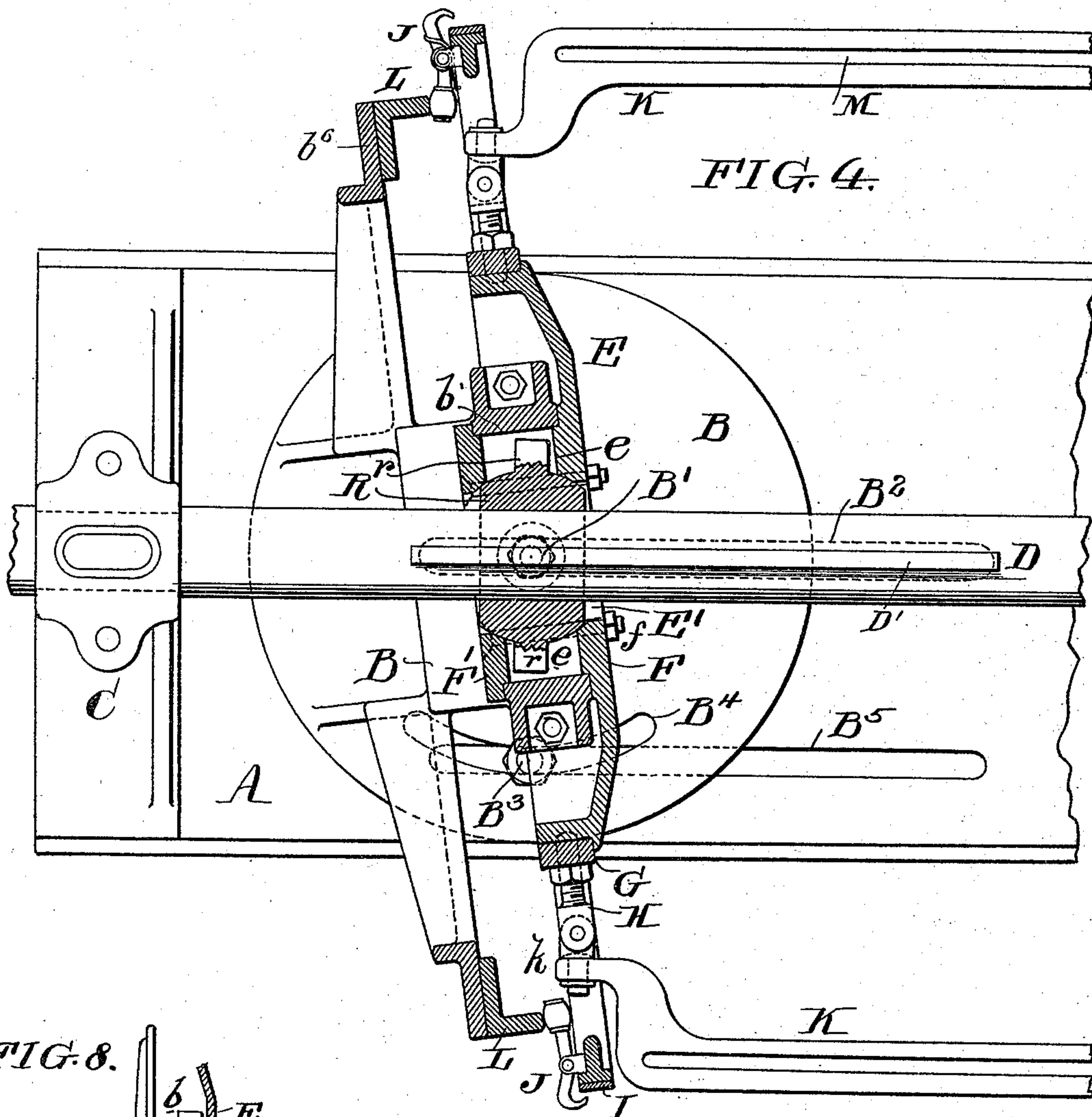
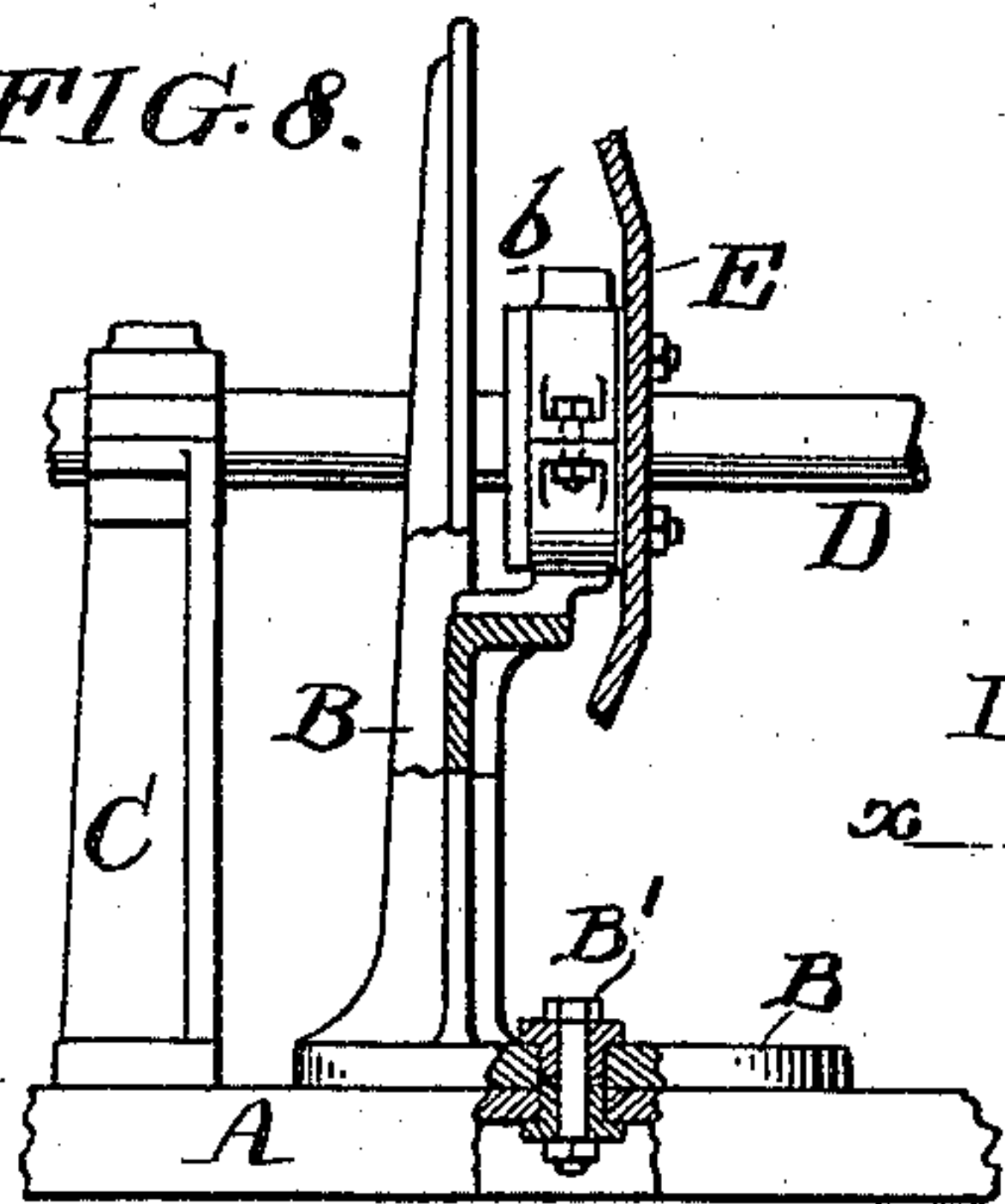


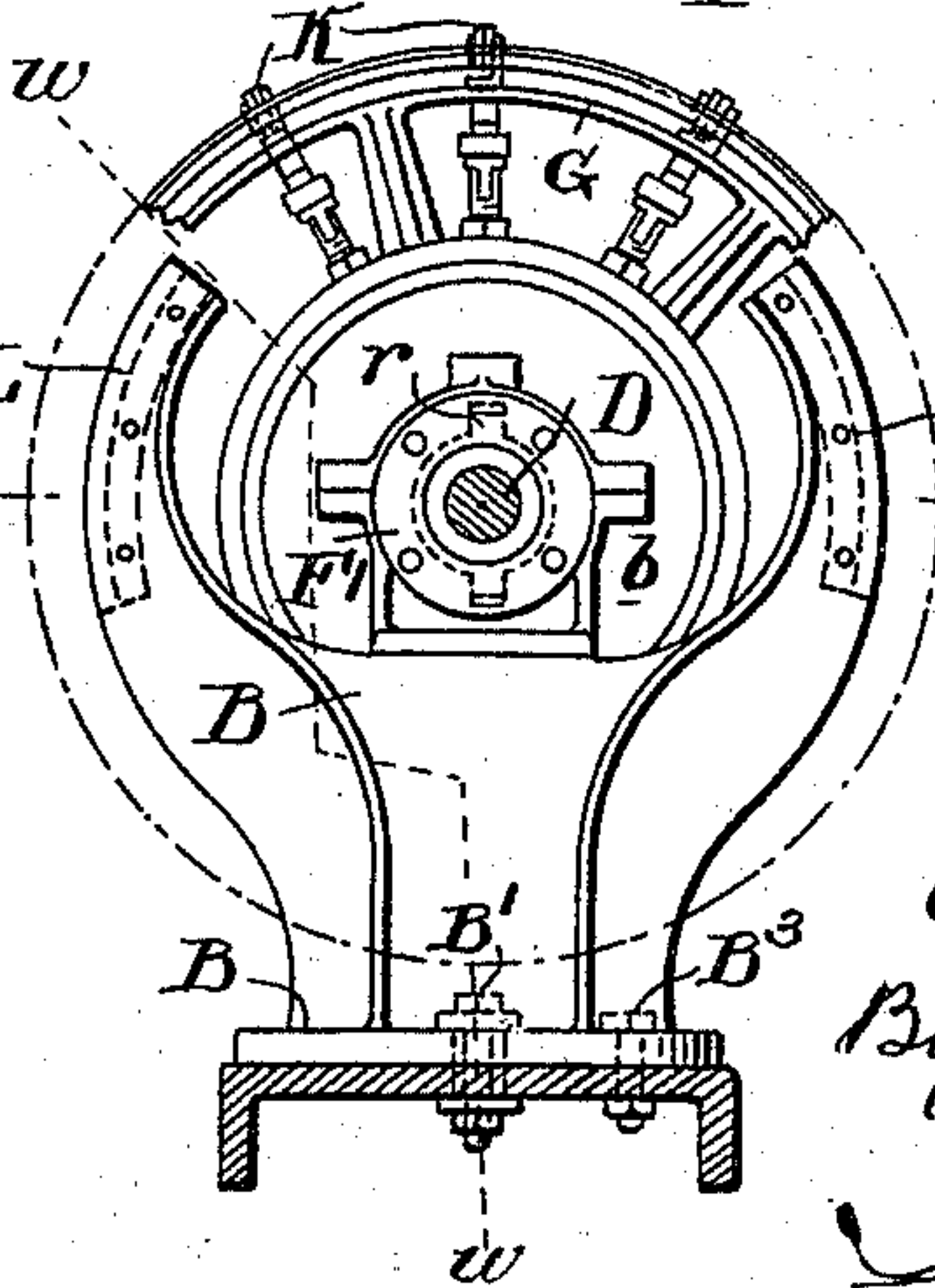
FIG. 8.



WITNESSES:

Henry D. ...
Am. L. Evans

FIG. 3.



INVENTOR:

William C Mackinney

By *his attorney*

[Signature]

UNITED STATES PATENT OFFICE.

WILLIAM C. MACKINNEY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
THE H. W. BUTTERWORTH & SONS COMPANY, OF PENNSYLVANIA.

TEXTILE-STRETCHING DEVICE.

SPECIFICATION forming part of Letters Patent No. 573,095, dated December 15, 1896.

Application filed August 18, 1894. Serial No. 520,661. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. MACKINNEY, of the city and county of Philadelphia and State of Pennsylvania, have invented an
5 Improvement in Textile-Stretching Devices, of which the following is a specification.

My invention has reference to textile-stretching devices; and it consists of certain improvements which are fully set forth in the
10 following specification and shown in the accompanying drawings, which form a part thereof.

My invention comprehends certain features of construction designed for the purpose of
15 stretching long lengths of fabric transversely throughout their entire lengths, so as to insure a uniform width thereto when the same is placed upon the market. The variation in the width of the fabrics is essentially due to
20 the various operations of bleaching, washing, drying, printing, &c., which take place after the fabric leaves the loom. In addition to these there are finishing operations which frequently change the width by shrinkages
25 and otherwise. In some cases the width falls within the normal width, and these places must be stretched to bring them to the proper width, so as to make the fabric uniform throughout.

30 The object of my invention is to provide a suitable construction for accomplishing the stretching of the fabric in a perfect manner and without injury to the same.

My improved machine is adapted to be used
35 in connection with drying-machines, calenders, and other finishing machinery, so that the fabric may be stretched while in the moistened or dampened condition just prior to being run upon the drying-cylinders or
40 other machines, where it is properly dried and finished. In treating it upon my improved machine the fabric will be brought to the proper width and as a finished article it will retain that width.

45 In carrying out my invention I provide two heads or circular supports, having upon their peripheries suitable clamps or devices for holding the edges of the fabric to the heads or circular supports. Intermediate of
50 these heads I employ adjustable supporting-bars for keeping the fabric in a supported

and stretched condition while being carried around by the heads. I also provide means for adjusting the heads or circular supports relatively one to the other to suit fabrics of
55 different widths, and further provide adjusting devices for setting the heads at angles to each other, so that as the heads revolve the edges of the fabric are drawn apart for the purpose of stretching it. The heads or cir-
60 cular supports are carried in suitable bearings, which will permit of their adjustment, and are driven by a shaft or power device at the same speed, which speed shall also be commensurate with that of the drying-cyl-
65 nders or other receiving apparatus which takes the textile material from the stretching devices. The clamps are preferably opened and closed automatically to receive and clamp
70 the fabric at the proper instant and also to release it at the proper time. The intermediate bar-supports between the two heads are preferably curved slightly, so as to extend outward to a small extent at the middle or
75 intermediate part for the purpose of imparting a slightly-increased stretching action at the middle of the fabric in the direction of the length than would take place if the said supports or bars were perfectly horizontal
80 and straight, as I have found that such construction is advantageous, one reason for which may be attributed to the fact that the edges of the fabric are clamped to perfectly circular supports or heads, whereas the inter-
85 mediate parts of the fabric are sustained upon a series of bars and forms and the straight portions of the fabric intermediate of these supports, which would, unless the supporting-
90 bars were slightly curved, give a shorter length to the center of the fabric than its edges, or would permit the fabric to bag in the middle and thereby present difficulties in its manipulation. By my improvement these defects are entirely overcome.

My invention will be better understood by
95 reference to the accompanying drawings, in which—

Figure 1 is a plan view of a stretching-machine embodying my improvements. Fig. 2 is a plan view of the same with an additional
100 support at the middle, showing a modification of the construction illustrated in Fig. 1. Fig.

3 is an end elevation of my improved machine. Fig. 4 is a sectional plan view of same on line $x x$ of Fig. 3. Fig. 5 is an enlarged elevation of a portion of the supporting rods or bars. 5 Fig. 6 is a sectional elevation of same on line $y y$, Fig. 5. Fig. 7 is a transverse section through the same bars on line $z z$ of Fig. 5, and Fig. 8 is a vertical sectional elevation of one of the bearings and a portion of the 10 head of my improved machine on line $w w$ of Fig. 3.

A is the bed-plate of the machine.

B are two pedestals arranged upon the bed-plate or main frame of the said machine, and 15 are adjustable about vertical axes for the purpose of adjusting the heads of the drum at the proper angles. The pedestals B are pivoted to the base-plate at B' on vertical axes, and the pivot-bolts or supports, of whatever 20 character, may be adjustable in the slots B² in said bed-plate. An adjusting or clamping bolt B³ may extend through a curved slot B⁴ in the pedestal and a straight slot B⁵ in the base for the purpose of clamping the said ped- 25 estal in any desired position. Both pedestals are adjustable in the same manner, if desired. In this way the angle of the two heads E may be relatively adjustable to vary the extent of stretching, and the width of the 30 machine may be readily adjusted to suit fabrics of different widths.

C are bearings secured to or formed upon the bed-plate and have the driving-shaft D journaled therein. The said shaft may be 35 provided with a gear d or any other suitable device for driving it. The shaft D is provided with feathers D'. Loosely secured to said shaft near each end are the cylinder-heads E, which are caused to rotate by the 40 revolution of said shaft. These cylinder-heads E are journaled in overhanging bearings b on the pedestals B, and therefore the heads as entireties are journaled in bearings inclosing the shaft D and moving upon axes 45 at an angle to the axis of the said shaft, and yet at the same time being driven with a speed commensurate with that of the shaft.

I will now describe the heads specifically. Upon the shaft D is a ball-collar R, which is 50 provided with one or more projecting pins e and rotates with the shaft through the feather d . Journaled in the bearings b of the pedestal B is the circular portion or hub of the head E, the said portion consisting of a large 55 disk F², having a hub or journal formed of two halves F F', bolted together, as at f , to the bearing b . The said hub portions F F' are provided with transverse slots r , adapted to receive the pins or projections e of the ball- 60 collar. It will now be observed that if the shaft D rotates the ball-collar R rotates with it and, through the media of the pins e , causes the disk F² to revolve, but permitting the angle or obliquity of said disk with the shaft to be maintained by the proper adjustment of 65 the pedestal B. The hubs are provided with

large openings E', which permit full adjustment of the head without binding upon the shaft D during its revolution. Secured to the disk F² at its perimeter is a wheel-shaped 70 casting G, having a circular outer rim upon which a brass band I is shrunk or otherwise secured. Pivoted to the outer portion of this wheel-shaped part are the clamps J, which are spring-actuated in one direction to clamp 75 the fabric and operate to release the fabric or to be held in a position ready to grasp it by cams L upon arms b^6 , carried upon the pedestals B. There are two of these cams, one to operate the clamps or nippers to grasp the 80 fabric and the other to operate the nippers to release the fabric. Intermediate of these cams the nippers hold the fabric at its edges and gradually draw said edges apart during the revolution of the cylinder. Secured to 85 the wheel-shaped casting G, intermediate of the spokes, there are a series of adjustable supports H, to which are journaled at k the supporting-bars K. These supporting-bars are jointed, as clearly indicated on Sheet 1. One 90 end of each of the two bars is hinged, as described, to the respective heads, and the other ends of said bars, constituting a pair, are provided with sliding connections m , which permit the bars to slide one upon the other to 95 compensate for the obliquity of the rotating heads. These bars support the fabric intermediate of the heads, and I have found that in practice it is best to make the said bars project outwardly to a small extent at their 100 centers, so that the center of the fabric may be slightly stretched or kept taut in passing through the apparatus. This is clearly shown in Figs. 1 and 2. The bars are provided with longitudinal slots M, in which the sliding 105 connections m work, so that no rough edges are presented to the fabric, and at the same time the bars are readily adjustable for fabrics of different widths. These bars compensate for their constantly-changing lengths 110 due to the rotation of the cylinder. Where the fabric is very wide and the bars K K exceedingly long, it is advisable to place in the center of the shaft D, intermediate of the heads, a disk N, having radially-adjustable 115 supports n for receiving the bars K at their middle parts, as will be readily understood. The connection of said parts n with the bars is indicated at P in Figs. 5 and 6 and forms a support for said bars, leaving them freedom 120 of sliding longitudinally. The supports n are made radially adjustable, so that any reasonable degree of curvature may be secured in the bars. The ends of the bars K are made with inwardly-projecting feet reach- 125 ing to the joints k and operate to permit the outer edges of the bars to be in substantial alinement with the perimeter of the heads where the fabric is clamped by the nippers or clamps. The entire circumference of the 130 head is provided with nippers or holding devices of some kind arranged at close inter-

vals, so that the fabric is grasped and held at numerous points, and thus does not slip in the stretching operation.

An important feature of construction in my machine lies in the fact that the heads are made to project backwardly over the bearings *b*, so that the one part of the perimeter of the head shall project as much to one side of the pivoted point with the shaft as the diametrically opposite part projects to the other side of the pivoted point, which construction is clearly shown in Fig. 4. The advantage of this is to keep the curvature described about the various bars *K* as near a circle and concentric with the shaft as possible. It is to be understood that the angle at which the heads are shown in the drawings is exaggerated to what is actually employed in practice, the said exaggeration being for the purpose of bringing out the features of construction more fully. The obliquity of these heads may be anything desired, and as the distance from the shaft *D* to the outside of the bars *K*, at the point where the fabric is received, is equal to the distance between said shaft to the outside of the bars *K*, where the fabric is liberated, it is evident that the fabric is subjected to a uniform tension, which permits it to be stretched and delivered under the best conditions.

I do not confine myself to the mere details of construction, as they may be modified in various ways without departing from my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a textile-fabric-stretching machine, the combination of two sets of clamps or fabric-holding devices arranged in circles and in which the plane of one set of clamps or holding devices is at an angle to the plane of the other set of clamps or holding devices, suitable supports for said two sets of clamps or holding devices, a series of intermediate supporting-bars extending between two sets of clamps or holding devices, means for rotating the supports for said clamps and intermediate supporting-bars at equal speeds, and an intermediate rotating support common to the bars extending from both heads adapted for supporting the adjacent ends of the bars to hold them against inward sagging at a point intermediate of the two sets of clamps or holding devices.

2. In a textile-fabric-stretching machine, the combination of two sets of clamps or fabric-holding devices arranged in circles and in which the plane of one set of clamps or holding devices is at an angle to the plane of the other set of clamps or holding devices, suitable supports for said two sets of clamps or holding devices, a series of intermediate supporting-bars extending between two sets of clamps or holding devices, means for rotating the supports for said clamps or holding devices and intermediate supporting-bars at

equal speeds, an intermediate support for said supporting-bars to hold them against sagging at a point intermediate of the two sets of clamps, and means to adjust the said intermediate support so as to impart a greater or less curvature or outward projection to the supporting-bars at points intermediate of their ends.

3. In a textile-fabric-stretching machine, the combination of two revolving heads, a series of clamps or means for holding the edges of the fabric carried upon the peripheries of said heads, bearings for said revolving heads for holding them at an angle to each other, in combination with a series of extendible supporting-bars arranged between the two heads and connected at their outer ends with the said heads by pivoted joints, an intermediate support revolving with the said shaft for supporting the said bars in a plane intermediate of the two heads, and means to adjust the bars radially upon the said intermediate support to vary the outward curvature of said bars at their intermediate parts.

4. In a textile-fabric-stretching machine, the combination of two adjustable pedestals or standards having horizontal bearings at top, two heads journaled in the bearings of said pedestals or standards and having their peripheries extended backward over said bearings so as to be substantially in line with a vertical plane through the bearings of said standards, and means upon the peripheries of said heads for holding the fabric, the construction being such that the two heads may be rotated in planes at an angle to each other and adjusted about said bearings as a center.

5. In a textile-fabric-stretching machine, the combination of two adjustable pedestals or standards having horizontal bearings at top, two heads journaled in the bearings of said pedestals or standards and having their peripheries extended backward over said bearings so as to be substantially in line with a vertical plane through the bearings of said standards, means upon the peripheries of said heads for holding the fabric, extensible supporting-bars arranged between the two heads for supporting the fabric intermediate of the said heads and means to rotate said heads and supporting-bars at equal speeds.

6. In a textile-fabric-stretching machine, a bed-plate, a pedestal adjustable thereon about a vertical axis and having an overhanging bearing at its upper part, a head having its central portion journaled in said bearing and its outer rim or perimeter arranged in a plane substantially through the said vertical axis, a rotating power-shaft, adjustable connections between the shaft and heads whereby they are rotated with the shaft, and suitable holding devices for holding the fabric to the said rim or perimeter, the construction being such that the adjustment of said heads and pedestals may be made without materially varying the speed of the perimeter or rim at its receiving and delivery points.

7. The combination of the pedestal B adjustable upon a vertical axis, a rotating head journaled in said pedestal and having a rim or perimeter extended backward so as to lie substantially in a plane through and between the bearing and vertical axis of the pedestal, a rotating shaft extending through the head and bearing, and a universal power-transmitting device between the said shaft and rotating head.

8. The combination of the pedestal B adjustable upon a vertical axis, a rotating head journaled in said pedestal and having a rim or perimeter extended backward so as to lie in a plane substantially through the bearing and vertical axis of the pedestal, a rotating shaft extending through the head and bearing, a universal power-transmitting device between the said shaft and rotating head, clamping devices carried upon the head adjacent to its rim, and cam devices adjustable with the pedestal for operating the said clamps at specified intervals.

9. The combination of the base or bed plate, a vertical pedestal adjustably secured to the said base or bed plate whereby it may be adjusted about a vertical axis and also horizontally and further provided with an overhanging bearing of large diameter, a rotary power-shaft journaled upon said base or bed plate and arranged substantially over the vertical axis of the pedestal and extending through the bearing thereof, a stretching-head having a central portion journaled in the said overhanging bearing and extending backward at its periphery so as to come substantially into

line with a transverse plane through the vertical axis of the pedestal and further provided with devices for clamping or holding the fabric to be stretched during its rotation, and adjustable or compensating power-transmitting connections between the rotating shaft and head.

10. The combination of the base or bed plate, a vertical pedestal adjustably secured to the said base or bed plate whereby it may be adjusted about a vertical axis and also horizontally and further provided with an overhanging bearing of large diameter, a rotary power-shaft journaled upon said base or bed plate and arranged substantially over the vertical axis of the pedestal, a stretching-head having a central portion journaled in the said overhanging bearing and extending backward at its periphery so as to come into substantial line with a transverse plane through the vertical axis and further provided with devices for clamping or holding the fabric to be stretched during its rotation, adjustable or compensating power-transmitting connections between the rotating shaft and head, and supporting-bars for the fabric having their outer edges substantially in alinement with the outer periphery of the head and universally pivoted to the head substantially in a plane through the axis of the pedestal.

In testimony of which invention I have hereunto set my hand.

WM. C. MACKINNEY.

Witnesses:

ERNEST HOWARD HUNTER,
C. H. NEWCOMB.